

Lightweight Electrical Power Cable Production, Phase I

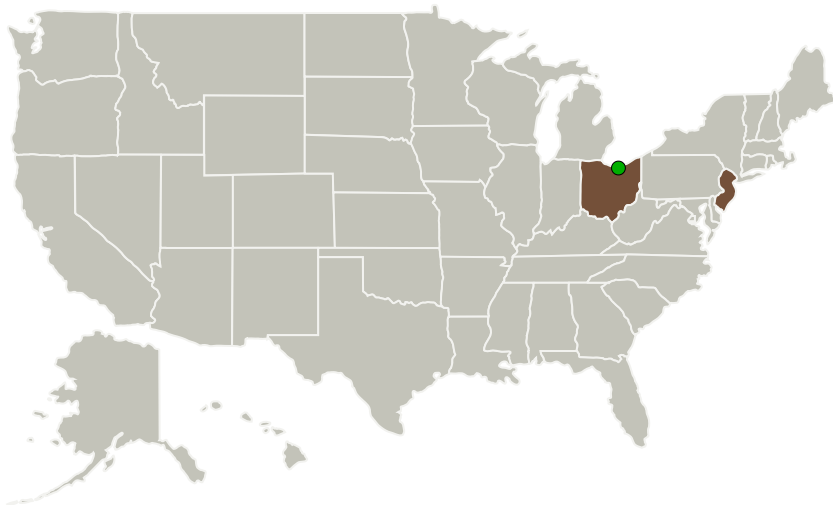
Completed Technology Project (2017 - 2017)



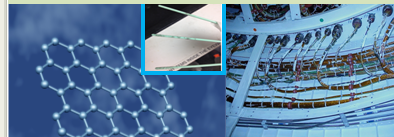
Project Introduction

In this SBIR Program, Structured Materials Industries, Inc. www.structuredmaterials.com (SMI), working with the University of Colorado Colorado Springs (UCCS) will develop graphene wire, as a lightweight higher conductivity superior electrical power transmission cable to present copper (or aluminum) wire. Replacing metal wiring with graphene wire will result in significant weight savings for space, military, and commercial craft; translating directly to reduced fuel consumption, extended operational parameters, and increased payload. The technology developed in this SBIR will ultimately be extended to many other systems with electrical or electronic subcomponents. In prior wire work, SMI demonstrated the concept of producing lightweight, highly conductive wire based on multiple layers of graphene. Calculations based on that work showed that a greater than 50% weight reduction is possible by replacing copper wires with graphene wires. The weight savings increased with higher amperage wires. We will build upon the prior work and demonstrate technology for manufacturable production of graphene wire to NASA performance specifications. We will also produce and deliver samples of lightweight graphene wire for evaluation by our NASA sponsors.

Primary U.S. Work Locations and Key Partners



Power Cables: <12% weight and < 78 % diameter of copper.



(left) The molecular structure of graphene. Insert shows making early graphene wires at SMI and (right) Example of where such power cables fit into NASA missions.

Lightweight Electrical Power Cable Production, Phase I Briefing Chart Image

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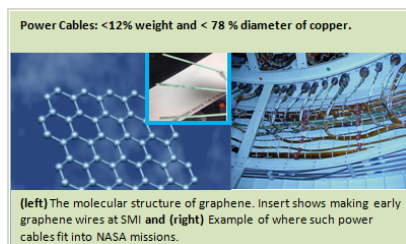


Organizations Performing Work	Role	Type	Location
Structured Materials Industries, Inc.	Lead Organization	Industry	Piscataway, New Jersey
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

New Jersey	Ohio
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Images



Briefing Chart Image

Lightweight Electrical Power Cable Production, Phase I Briefing Chart Image

(<https://techport.nasa.gov/image/135126>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Structured Materials Industries, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

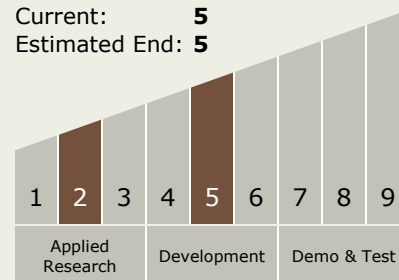
Carlos Torrez

Principal Investigator:

Gary S Tompa

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.2 Distribution and Transmission

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System